ELLA CHEONG | MIRANDAH & SPRUSONS
PATENT, DESIGN AND TRADE MARK AGENTS

ECIMS
SINGAPORE

ELLA CHEONG MIRANDAH
& SPRUSONS PTE LTD
111 NORTH BRIDGE ROAD
#22-01 PENINSULA PLAZA
SINGAPORE 179098
TEL : +65 6 333 7200
FAX : +65 6 333 7222
MAIL@ECMS-ASIA.COM
WWW.ECMS-ASIA.COM

OUR REF : 6393SG3/GM/NSC/pds
YOUR REF : PF-2688/NEC/Singapore/mh
DATE : 10 January 2003

FAX NO : +81-3-3404-5748
PAGES : 2



**VIA FACSIMILE & MAIL**

**Universal Patent Bureau**
Akasaka P.O. Box 75
Minatoku
Tokyo 107-0062
Japan

CONFIRMATION
RECEIVED
with thanks and
our careful attention
JAN 17 2003
UNIVERSAL PATENT

Dear Sirs,

**SINGPORE PATENT APPLICATION NO. 200005729-9**
**INVENTION: MULTILAYER INTERCONNECTION BOARD, SEMICONDUCTOR DEVICE HAVING THE SAME, AND METHOD OF FORMING THE SAME AS WELL AS METHOD OF MOUNTING THE SEMICONDUCTOR CHIP ON THE INTERCONNECTION BOARD**
**APPLICANT: NEC CORPORATION**

We are pleased to inform you that a Written Opinion has issued on the above-identified application by the Australian Patent Office acting on behalf of the Intellectual Property Office of Singapore. The final date for responding to the Written Opinion is:

**2 June 2003**

In the Written Opinion, the Examiner has raised a lack of unity objection. Therefore, only claims 1-42 and 47-72 were considered by the Examiner in the Examination. The Examiner is of the opinion that claims 43-46 relate to another invention having a second special technical feature which is based on the eighth embodiment on pages 171-174 and FIG. 17. Please let us know if you agree. If you agree, it is possible to file divisional application for the subject matter of the claims 43-46. Please note that divisional application should be filed two (2) months after filing a response to this Written Opinion if the response removes claims 43-46 from the claims from this application.

The Examiner has indicated that claims 1-42 and 49-72 are novel and inventive. However the Examiner has objected to claims 47 and 48 in view of the six cited documents: US5136123 (D1), US4847136 (D2),

# AUSTRALIAN PATENT OFFICE

## WRITTEN OPINION

| | |
|---|---|
| | Date of mailing *day/month/year* 05 DEC 2002 |
| Applicant's or agent's file reference<br>6393 AU3 (519898SG) | **REPLY DUE** within FIVE MONTHS of the date of the Registrar's letter enclosing the written opinion |

| Application No. | Application Filing Date *(day/month/year)* | Priority Date *(day/month/year)* |
|---|---|---|
| SG 200005729-9 | 5 October 2000 | 5 October 1999 |

International Patent Classification (IPC) (as indicated in the search report)

**Int. Cl.** [7] H01L 23/50, 21/58, 21/60, 21/68

Applicant

NEC CORPORATION

1. This second written opinion consists of a total of 6 sheets.
2. This opinion contains indications relating to the following items:.

| | | |
|---|---|---|
| I | [X] | Basis of the opinion |
| II | [X] | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| III | [X] | Lack of unity of invention |
| IV | [X] | Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| V | [ ] | Certain documents cited |
| VI | [ ] | Certain defects in the application |
| VII | [X] | Certain observations on the application |

3. This opinion is based upon the assumption that the priority claim is valid.
4. The search report used was issued by the **Australian Patent Office**, and the date of completion is: 10 May 2002
5. If no reply is filed, the examination report will be established on the basis of this opinion.
6. The date by which the examination report will be established is: **5 January 2004**

| Name and mailing address | Authorized Officer |
|---|---|
| AUSTRALIAN PATENT OFFICE<br>PO BOX 200, WODEN ACT 2606, AUSTRALIA<br>E-mail address: pct@ipaustralia.gov.au<br>Facsimile no. 61 2 62853929 | **LARS KOCH** |

Form APO/SG/408 (Cover Sheet)(Feb 2000)

**AUSTRALIAN PATENT OFFICE**

**WRITTEN OPINION**

Application No.
**SG 200005729-9**

**I. Basis of the opinion**

1. This opinion has been drawn on the basis of:

☐ the application as originally filed.

☒ the description, pages , as originally filed,
pages , filed with the request,
pages **1-12, 14-240** , received on **22 January 2001** with the letter of **22 January 2001**
pages **7-13, 13a**, received on **11 October 2002** with the letter of **11 October 2002**

☒ the claims, pages , as originally filed,
pages , filed with the request,
pages **245-249** , received on **22 January 2001** with the letter of **22 January 2001**
pages **241-244, 250-259** , received on **11 October 2002** with the letter of **11 October 2002**

☒ the drawings, sheets/fig. , as originally filed,
sheets/fig. , filed with the request,
sheets/fig. **1-158** , received on **22 January 2001** with the letters of **22 January 2001**

☐ the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand
pages , received on with the letter of

2. The amendments have resulted in the cancellation of: pages:
sheets of drawings/figures No :

3 ☐ This opinion has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box.

4. Additional observations, if necessary:

**AUSTRALIAN PATENT OFFICE**

**WRITTEN OPINION**

Application No.

ERROR! REFERENCE SOURCE NOT FOUND.

**II. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been and will not be examined in respect of:

☐ the entire application,

☒ claims Nos: **43-46**

because:

☐ the said application, or the said claim Nos. relate to the following non-patentable subject matter (section 13(3)) which does not require an examination *(specify)*:

☐ the description, claims or drawings *(indicate particular elements below)* or said claims Nos are so unclear that no meaningful opinion could be formed *(specify)*:

☐ the claims, or said claims Nos are so inadequately supported by the description that no meaningful opinion could be formed.

☒ no search report has been established for said claim Nos. **43-46**

Form APO/SG/408 (Box II)(Feb 2000)

**AUSTRALIAN PATENT OFFICE.**

**WRITTEN OPINION**

Application No.

**SG 200005729-9**

**III. Lack of unity of invention**

1. This Office found multiple invention in this application, as follows:

1. Claims 1-42, 47-72 are directed to various aspects of a device and method in which a high rigidity plate is securely fixed to an interconnection board for suppressing bending of the board (independent claims 1, 8, 47, 67, 69); and a buffer layer in contact with an interconnection board and capable of absorbing and/or relaxing stress applied to a buffer layer electrode to make the interconnection board free from application of stress (independent claim 18). It is considered that a high rigidity plate or buffer layer to suppress bending or stressing of an interconnection board, respectively, comprises a first special technical feature.

2. Claims 43-46 are directed to a second special technical feature of a supporting layer on a surface of an interconnection board for supporting external electrodes on the board. These claims appear to be based on the eighth embodiment on pages 171-174 and fig 17 in which the supporting layer is to increase bonding stability between solder balls and external electrode pads, and in which a stress-freeing buffer or bend-suppressing high rigidity plate is not an essential feature (page 172 line 17).

Since the abovementioned groups of claims do not share either of the technical features identified, a "technical relationship" between the inventions, as defined in PCT rule 13.2 does not exist. Accordingly the international application does not relate to one invention or to a single inventive concept

2. Consequently, the following parts of the application were the subject of examination in establishing this report:

☐ all parts.

☒ the parts relating to claims Nos. **1-42, 47-72**

| AUSTRALIAN PATENT OFFICE<br>WRITTEN OPINION | Application No.<br>SG 200005729-9 |
|---|---|

**IV. Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

| | | |
|---|---|---|
| Novelty (N) | Claims **1-42, 49-72** | YES |
| | Claims **47, 48, ,** | NO |
| Inventive step (IS) | Claims **1-42, 49-72** | YES |
| | Claims **47, 48,** | NO |
| Industrial applicability (IA) | Claims **1-42, 47-72** | YES |
| | Claims | NO |

2. Citations and explanations

The invention as presently claimed in claims 47, 48 are not considered novel or inventive in the light of the citations raised in the previous opinion, namely:

a) US5 136 123

b) US 4 847 136

c) GB 2 286 084

d) EP 788 158

e) JP 08-306745

f) JP 08-0787570

The applicant asserts the present invention relates to a manufacturing process wherein an interconnection board is securely fixed to a high rigidity plate for suppressing any stress and/or strain applied to the interconnection board during manufacture. Furthermore the plate is fixed to the majority of a surface of the board. It is then contended that none of the cited references disclose an invention whereby a high rigidity plate is connected to the board *only* during the manufacturing process, and a majority fixed at that. That is to say, the applicant submits the present invention does not relate to any reinforcing plate to provide mechanical strength the interconnection board as a final product, contrary to the cited documents.

Claim 47 in particular, however is not restricted by such features, which are submitted as distinguishing from the prior art. There is nothing in the claim to explicitly limit the rigid plate from *only* being present during the manufacture process, in order to suppress any stress or bending forces *during the manufacturing process per se*. Similarly there is nothing to limit the plate to cover a majority of the interconnection board during the manufacturing process. As a consequence, claims 47 and 48 are considered to lack novelty in the light of the cited documents.

**AUSTRALIAN PATENT OFFICE**

**WRITTEN OPINION**

Application No.

**SG 200005729-9**

**VII. Certain observations on the application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claims 18, 47, 67 and 68 are not fully supported by the description for the following reason. From a fair reading of the specification as a whole, and the submissions made by the applicant, it appears the present invention relates to the manufacture of interconnection boards having a high rigidity plate fixed to a majority of a surface of an interconnection board. The high rigidity plate only being present during the manufacturing process in order to suppress any stress or bending forces applied to the board during the manufacturing process. The role of the plate appears not to be to support the general shape of the final product.

However, the above mentioned claims are not so limited and clearly go beyond the scope of such a disclosure. They include within their scope a final product having a plate attached, and/or are not restricted to having a high rigidity plate connected to a interconnection board solely during the manufacturing process, and hence are not supported by the description.

[X] The claimed invention is patentable according to Section 13(2); or

[ ] The claimed invention is unpatentable according to Section 13(2) because: